

main of analytic chemistry. It is true that his hopes were directed to the transmutation of the metals, but in his attempts to fulfill this object he not only improved the practical manipulation of ores, but he also enlarged the insight of men into the general mode of action of the chemical forces of nature. His works contain some extremely acute observations on the organic structure and physiology of plants. He was acquainted with the sleep of plants, the periodical opening and closing of flowers, the diminution of the sap during evaporation from the surfaces of leaves, and with the influence of the distribution of the vascular bundles on the indentations of the leaves. He wrote commentaries on all the physical works of the Stagirite, although in that on the history of animals he followed the Latin translation of Michael Scotus from the Arabic.* The work of Albertus Magnus, entitled *Liber Cosmographicus de Natura Locorum*, is a kind of physical geography. I have found in it observations, which greatly excited my surprise, regarding the simultaneous dependence of climate on latitude and elevation, and the effect of different angles of incidence of the sun's rays in heating the earth's surface. Albertus probably owes the praise conferred on him by Dante less to himself than to his beloved pupil St. Thomas Aquinas, who accompanied him from Cologne to Paris in 1245, and returned with him to Germany in 1248.

Questi, che m'è a destra più vicino,
Frate e maestro fummi; ed esso Alberto
E' di Colonia, ed io Thomas d'Aquino.

Il Paradiso, x., 97-99.

In all that has directly operated on the extension of the natural sciences, and on their establishment on a mathemat-

* The greater share of merit in regard to the history of animals belongs to the Emperor Frederic II. We are indebted to him for important independent observations on the internal structure of birds. (See Schneider, in *Reliqua Librorum Frederici II., imperatoris de arte venandi cum avibus*, t. i., 1788, in the Preface.) Cuvier also calls this prince of the Hohenstaufen line the "first independent and original zoologist of the scholastic Middle Ages." On the correct view of Albert Magnus, on the distribution of heat over the earth's surface under different latitudes and at different seasons, see his *Liber Cosmographicus de Natura Locorum*, Argent., 1515, fol. 14 b. and 23 a. (*Examen Crit.*, t. i., p. 54-58.) In his own observations, we, however, unhappily too often find that Albertus Magnus shared in the uncritical spirit of his age. He thinks he knows "that rye changes on a good soil into wheat; that from a beech wood which has been hewn down, a birch wood will spring up from the decayed matter; and that from oak branches stuck into the earth vines arise" (Compare, also, Ernst Meyer, *Ueber die Botanik des 13ten Jahrhunderts*, in the *Linnaea*, bd. x., 1836, s. 719.)